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New species of the genus *Nemophora* (Adelidae) from Primorye region and Sakhalin, Russia

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Summary

Three new species of fairy moths (*Nemophora insulariella* sp. n., *N. sinevi* sp. n. and *N. ochrocephala* sp. n.) are described and illustrated from the Russian Primorye and Sakhalin Island. The phylogenetic relationships of these species with other representatives of the genus *Nemophora* Hoffmansegg are tentatively discussed.

Zusammenfassung

Es werden drei neue Arten der Langhornmotten (*Nemophora insulariella* sp. n., *N. sinevi* sp. n. und *N. ochrocephala* sp. n.) vom Fernen Osten Russlands und der Insel Sachalin beschrieben und abgebildet. Die phylogenetische Verwandtschaft dieser Arten mit den anderen Vertretern des Genus *Nemophora* Hoffmansegg in ihrer vorläufigen Gruppierung werden diskutiert.

Résumé

Trois nouvelles espèces d'Adelidae (*Nemophora insulariella* sp. n., *N. sinevi* sp. n. et *N. ochrocephala* sp. n.) sont décrites et illustrées, provenant du Primorye russe et de l'île de Sakhalin. Les relations phylogénétiques de ces espèces par rapport à d'autres représentants du genre *Nemophora* Hoffmansegg sont discutées provisoirement.

Introduction

The data on taxonomy and distribution of Adelidae (s. str.) in Russia east of Ural Mts are very scarce. Only eight species of fairy moths (genus *Nemophora* Hoffmansegg, 1798) have been mentioned from Russian Primorye (Primorskiy kray) by Moriuti (1982), and additionally *N. sylvatica* Hirowatari was recorded in Sakhalin and Kunashir Islands (Hirowatari, 1995).

In course of preparation of the manuscript for the forthcoming book "Keys to the insects of the Far East of Russia. Lepidoptera" (Kozlov, 1997) it became apparent that three species collected in this region are still undescribed. Although the taxonomic revision of the genus *Nemophora* is in progress now (Kozlov, 1995 ; Kozlov & Robinson, 1996), I was urged to publish the separate descriptions of these species to make them available prior to the appearance of the mentioned book.

The type specimens of *N. albiantennella* Issiki (kept in the U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C.) and *N. ahenea* Stringer (kept in The Natural History Museum, London), which are most closely related to *N. insulariella* sp. n. and *N. ochrocephala* sp. n., respectively, were examined during this study. Colour photos of *N. albiantennella* and *N. ahenea* were published by Moriuti (1982) ; for male genitalia of *N. ahenea*, see Kozlov (1997). The identity of *N. dumerilella* Dup., a common European species, is accepted according to Küppers (1980).

The male genitalia were examined and figured as described by Kozlov (1993). The interocular index was measured according to Davis (1975), being the ratio between the vertical diameter of the compound eye and the interocular distance measured at a point of the frons midway between the base of the antennal sockets and the anterior tentorial pits. The minimum distance between compound eyes is referred to as the occipital distance.

The type specimens are deposited in the Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZIN), the Zoological Museum, University of Helsinki (MZH) and the Zoological Museum, University of Copenhagen (ZMUC).

Nemophora insulariella n. sp.

Holotype ♂, "Russia, Sakhalin, surr. of Yuzhno-Sakhalinsk, 7.VII.1983, M. Kozlov" (ZIN).
Paratypes : ♂, "Russia, Sakhalin, surr. of Yuzhno-Sakhalinsk, 8.VII.1983, M. Kozlov" (MZH) ; ♂, Sakhalin, surr. of Yuzhno-Sakhalinsk, 7.VII.1983, S. Yu. Sinev (labelled in Russian) (ZIN).

Diagnosis. Differs from the closely related *N. albiantennella* Issiki by dark brown to black vertex, brassy green to bronze tint of forewings, gradual change of the colour along the male antenna, longer tegumen which exceeds the length of valva, very narrow arrow-head of juxta and smooth dorsal lobe at the apex of aedeagus in male genitalia.

Description. *Male.* Forewing length 5.0-5.3 mm ; wing expanse 10.8-11.4 mm. Vertex covered with dark brown to blackish raised hair-like scales ; frons with appressed dark bronze scales. Proboscis brown. Interocular index ca. 0.7. Labial palpus 1.1 × vertical eye diameter, dark bronze to brown. Antenna 3.5-3.6 × length of forewing, with simple inwardly directed pegs. Scape and proximal region of flagellum (0.7 × forewing length) brown, then colour gradually changes to light yellowish grey. Tegula, thorax (dorsum) and forewing dark, uniformly brassy green to bronze ; cilia dark brown, greyish on termen. Hindwing greyish brown, marginally purplish ; costal area grey ; cilia brown to grey. Legs dark brown, bronze shimmered. Epiphysis at one-half length of tibia, reaching its tip. Abdomen dark brown.

Female. Unknown.

Male genitalia (Figs. 3-7). Tegumen dome-shaped, without medial ridge. Length of socii equal to diameter of aedeagus. Vinculum 2.4 × length of valva, narrowly rounded anteriorly ; lateral margins slightly concave. Valva shorter than tegumen ; medial margin of valva with narrow lobe. Bases of valvae completely fused, with no signs of medial suture. Tip of valva narrow, tuberculate ; dorsal margin (viewed laterally) angulate. Aedeagus long, 1.3 × length of vinculum. Apical one-fifth of aedeagus consists of two lobes of equal length ; dorsal lobe smooth ; base of aedeagus of about the same diameter as the apex of aedeagus. Length of juxta 0.5 × length of aedeagus ; width of arrow-head 0.25 × its length ; both apex and lateral arms of arrow-head pointed.

Biology. Moths were collected flying at 1-1.5 m altitude in the daytime on a clearing in mixed forest near a small stream.

Etymology. Insula (Latin) — an island.

Note. *N. insulariella* exhibits sister-group relationships with *N. albiantennella*, as supported by the completely accreted valvae, very short (not reaching valvar base) medial valvar apodeme, and apical part of aedeagus consisting of the ventral and dorsal lobes.

Nemophora sinevi sp. n.

Holotype ♂, "Russia, Primorye reg., Khasan distr., Slavyanka, 19.7.1990, M. Kozlov" (MZH).
Paratypes : ♂ Primorskiy kray, Khasanskiy rayon, 3 km SE Andreevka, 22.VII.1985, S. Sinev (labelled in Russian) (ZIN) ; ♀, Primorskiy kray, Khasanskiy rayon, 3 km SE Andreevka, 21.VII.1985, S. Sinev (labelled in Russian) (ZIN) ; ♂, Primorskiy kray, Khasanskiy rayon, Zarubino, 6.7.1982,

S. Sinev (labelled in Russian) (ZIN) ; ♂, "Russia, Primorye reg., Khasan distr., Grebenchatyi Mountain Ridge, 4.7.1982, M. Kozlov" (MZH) ; ♂, "Russia, Primorye reg., Nadezhdinskij distr., Malaya Elduga river, 7.7.1982, M. Kozlov" (ZIN) ; ♀, Primorskiy kray, Khasanskiy rayon, Barabash-Levada, 21.VII.1989, S. Sinev (labelled in Russian) (ZIN) ; ♀, Primorskiy kray, 20 km E Ussurijsk, Gornotaezhnoye, on light, 30.VI.1990, S. Sinev (labelled in Russian) (ZIN) ; ♀, Primorskiy kray, Khasanskiy rayon, nature reserve "Kedrovaya Pad′", 26.VII.1988, S. Sinev (labelled in Russian) (ZIN).

Diagnosis. Very similar to *N. dumerilella* Dup., from which it differs by darker forewings, dark brown hindwings, narrower (width of base to length ratio ca. 0.6) valvae with longer medial lobe (reaching ca. 0.8 of valvar length), almost pointed tip of valva and narrower arrowhead of juxta in male genitalia.

Description. *Male.* Forewing length 5.5-6.5 mm ; wing expanse 12-13 mm. Vertex black ; frons dark bronze. Proboscis dark brown. Interocular index 1.1 ; occipital distance 0.15 × vertical eye diameter. Labial palpus short (0.6 × vertical eye diameter), brown, with sparse dark brown hair-like scales. Antenna 2.0-2.5 × length of forewing, with simple inwardly directed pegs. Scape and proximal region of flagellum dark brown ; distal region of flagellum light brown. Tegula and thorax (dorsum) light, glossy bronze. Forewing brassy green basally, dark bronze with purplish lustre apically. Basal dark brown longitudinal spot usually long, 0.2 × length of forewing. Fascia at 3/5 of the forewing length. Costal third of fascia oblique, narrower near the wing margin, whereas the dorsal part of fascia is perpendicular to the wing margin. Fascia diffuse, formed by dark brown scales ; central zone with sparse yellow scales. Distal part of the forewing near the middle of the external margin with vagile spot formed by several dark brown scales suffused among bronze scales ; quite rarely, several yellow scales were observed in this spot. Cilia dark brown to purplish. Hindwing dark brown, costal area dark grey ; cilia brown. Legs dark bronze to light brown. Epiphysis at one-half length of tibia, not reaching its tip. Abdomen brown.

Female. Vertex ochreous, frons glossy golden. Interocular index 0.8. Labial palpus light, straw-yellow to ochreous, ventrally with sparse raised brown scales. Antenna 1.2-1.3 × length of forewing ; scape and proximal region of flagellum (about 2/3 of the total length) dark brown with purplish lustre ; distal region light brown to yellowish-grey. Otherwise similar to male.

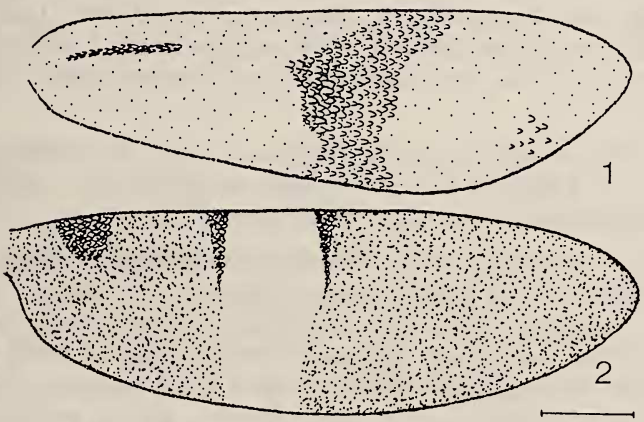
Male genitalia (Figs. 8-12). Tegumen dome-shaped, without medial ridge. Length of socii equal to diameter of aedeagus. Vinculum relative-

ly short (2.2 × length of valva), almost straight anteriorly ; lateral margins slightly concave. Valva longer than tegumen ; medial margin of valva with narrow lobe ; bases of valvae fused medially. Tip of valva narrow, with straight inner margin ; dorsal margin (viewed laterally) slightly S-shaped. Apical third of aedeagus consists of a narrow lobe swollen distally, with a small lateral hook-like process directed backwards ; diameter of the base of aedeagus 4 × diameter of the apical part of aedeagus. Length of juxta 0.5 × length of aedeagus ; width of arrow-head 0.5 × its length ; both apex and lateral arms of arrow-head pointed.

Biology. Moths were collected in broad-leaved forests ; swarming has not been recorded.

Etymology. Named after Dr. Sergei Sinev who collected a larger part of the type material.

Note. *N. sinevi* belongs to the *fasciella* species-group established by Küppers (1980), which includes *N. dumerilella*, *N. minimella* Den. et Schiff., *N. prodigella* Z., *N. fasciella* F., *N. auricella* Rag., *N. molella* Hb., and probably several other species.



Figs. 1-2. Forewing pattern : 1 — *Nemophora sinevi* sp. n. ; 2 — *N. ochrocephala* sp. n. (reference bar 1 mm).

Nemophora ochrocephala sp. n.

Holotype ♂, "Russia, Primorskiy kr[ay], Pogranichnyi rayon, Barabash-Levada, 21.VII.1989, S. Sinev" (labelled in Russian) (ZIN).
Paratypes : ♂, same label as in holotype, except the date "22.VII.1989" (ZIN). ♀, same label as in holotype, except the date "26.VII.1989" (ZIN). ♀, same

label as in holotype, except the date "31.VII.1989" (ZIN). ♀, "Russia, Primorye reg., 40 km E Luchegorsk, Verkhnyi Pereval, 12.7.1990, M. Kozlov" (MZH). ♂, "Far East [of Russia], Rogranitchnyj r[egion], Barabash-Levada, 29.VII. 1989, P. Ivinskis" (ZMUC).

Diagnosis. Similar to *N. ahenea* Stringer, from which it differs by ochreous forewing fascia, longer tegumen reaching the tip of valva, and longer medial lobe of valva exceeding 2/3 of valvar length.

Description. *Male*. Forewing length 6.3-6.4 mm ; wing expanse 13.6-13.8 mm. Vertex and frons covered with ochreous to pale yellow raised hair-like scales. Interocular index 1.3 ; occipital distance 0.1 × vertical eye diameter. Labial palpus short (0.7 × vertical eye diameter), ochreous. Antenna 2.8-3.0 × length of forewing, with simple inwardly directed pegs. Scape light, yellow to ochreous, proximal region of flagellum brown, then colour changes gradually to light grey ; basal 7-8 segments dorsally with narrow line of long raised greyish-brown scales. Tegula and thorax (dorsum) light, glossy bronze. Forewing glossy bronze ; costa near the wing base with large dark brown, purplish shimmered spot. Outer border of fascia situated in the middle of forewing ; near the costa, pale ochreous band is on both sides bordered by dark brown scales forming narrow triangular spots. Cilia bronze. Hindwing brown, costal area light grey ; cilia brown. Legs bronze, apical regions of tibia blackish, with purplish lustre. Epiphysis at one-half length of tibia, not reaching its tip. Abdomen light, yellowish-brown.

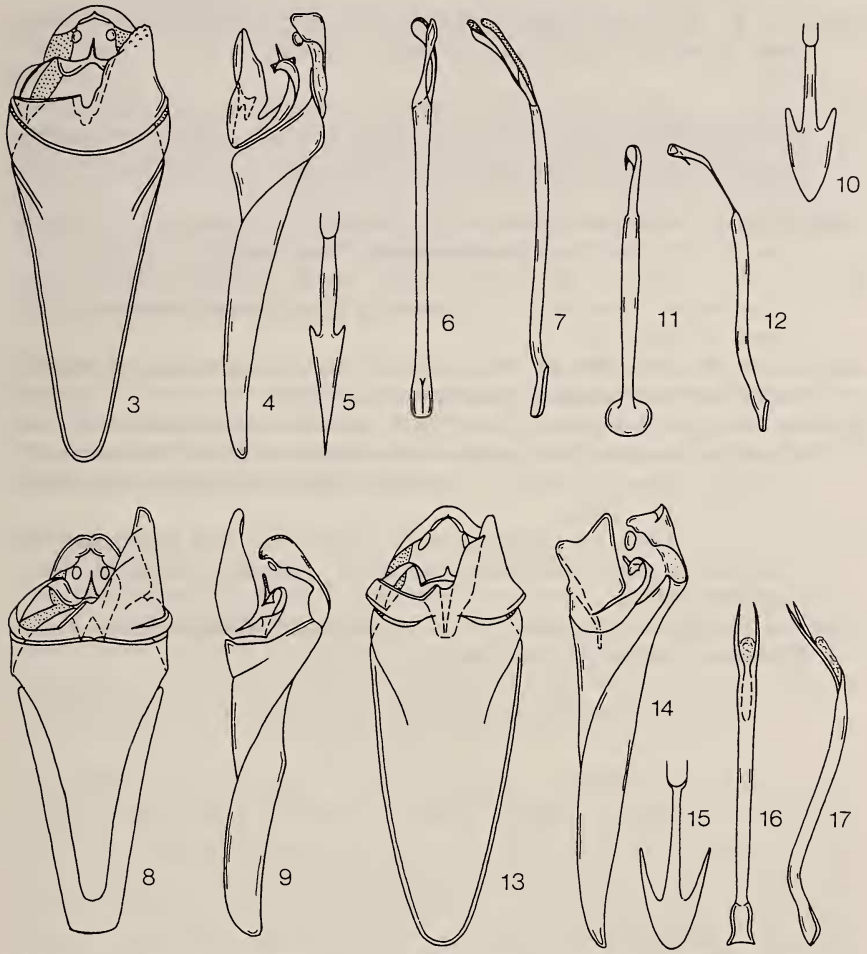
Female. Interocular index 0.7. Antenna 1.6-1.8 × forewing length ; scape yellow, flagellum dark brown with purplish lustre, slightly lighter in the distal region. Otherwise similar to male.

Male genitalia (Figs. 13-17). Tegumen dome-shaped, without medial ridge. Length of socii slightly exceeds diameter of aedeagus. Vinculum long (3 × length of valva), rounded anteriorly ; lateral margins almost straight. Valva longer than tegumen ; medial margin of valva with prominent lobe directed medioventrally ; valvae fused medially to each other and to the vinculum. Tip of valva narrow, almost pointed ; dorsal margin (viewed laterally) straight. Aedeagus (viewed laterally) S-shaped ; apex of aedeagus ventrally with two symmetrical carinae ; base of aedeagus slightly swollen. Length of juxta 0.5 × length of aedeagus ; width of arrow-head 0.7 × its length ; apex of arrow-head rounded but long lateral arms pointed.

Biology. Moths were collected in broad-leaved forests.

Etymology. Ochros (Greek) — ochreous, kephale (Greek) — head.

NOTE. *N. ochrocephala* exhibits sister-group relationships with *N. ahenea*, as supported by the position of fascia in the basal half of the forewing, presence of large dark costal spot at the forewing base, accreted valvae, very long arms of arrow-head of juxta, presence of symmetrical carinae at the apex of aedeagus, and prominent medial lobe of valva in male genitalia. Both these species are related to *N. tyriochrysa* Meyrick which, however, has a pair of carinae on the dorsal side of the aedeagus.



Figs. 3-17. Male genitalia : 3-7 — *Nemophora insulariella* sp. n. ; 8-12 — *N. sinevi* sp. n. ; 13-17 — *N. ochrocephala* sp. n. (3, 8, 13 — genital complex, ventral view ; 4, 9, 14 — genital complex, lateral view ; 5, 10, 15 — juxta ; 6, 11, 16 — aedeagus, ventral view ; 7, 12, 17 — aedeagus, lateral view) (reference bar 0.25 mm).

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